

Appl. No. 09/681,454  
Docket No. GIN-0390 / 41PR-7785

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

### Listing of Claims:

1-8. (Canceled)

9. (currently amended). A current sensor for use in an electrical device having a current rating, the current sensor comprising:

a mixed material magnetic core having at least a first plurality of layers of material having a relatively high magnetic permeability and at least a second plurality of layers of material having a relatively low magnetic permeability arranged proximate said first plurality of layers of material;

wherein said core has a profile with at least one opening therethrough for accepting a current carrying conductor;

wherein said profile is substantially O shaped, substantially C shaped, substantially figure-eight shaped, or any combination comprising at least one of the foregoing shapes; and

a signal generator that provides an output signal representative of the magnetic flux associated with said current carrying conductor;

wherein said mixed material magnetic core exhibits a dynamic range greater than a dynamic range of a similarly shaped magnetic core having only one of said first plurality of layers of material and said second plurality of layers of material.

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10. (Original) The current sensor of claim 9, wherein:  
said profile is substantially O shaped with at least one leg;  
wherein said signal generator is at least one secondary winding arranged about  
said leg; and  
wherein said secondary winding comprises a bobbin having first and second  
bobbin ends and wire turns arranged on said bobbin.
11. (Original) The current sensor of claim 9, wherein:  
said profile is substantially C shaped;  
wherein said core comprises spaced opposed gap faces to define an air gap  
therebetween; and  
wherein said signal generator is a magnetic flux sensor arranged within said air  
gap.
12. (Original) The current sensor of claim 9, wherein:  
said profile is substantially figure-eight shaped;  
wherein said core comprises spaced opposed gap faces in the central leg of said  
figure-eight shape to define an air gap therebetween; and  
wherein said signal generator is a magnetic flux sensor arranged within said air  
gap.
13. (currently amended) The current sensor of claim 9, wherein:  
said first and said second plurality of layers of material are a NiFe alloy having  
greater than about 50% Ni, a NiFe alloy having about 80% Ni, a Co-based amorphous

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metallic alloy, a CoFe alloy, a CoFe-V alloy, or any combination comprising at least one of the foregoing alloys; and

said second plurality of layers of material are a NiFe alloy having no greater than about 50% Ni, a NiFe alloy having about 50% Ni, an Fe-base amorphous metallic alloy, a SiFe alloy, or any combination comprising at least one of the foregoing alloys.

14. (previously presented) The current sensor of claim 9, whercin;  
said first plurality of layers of material has about 10% more Ni than said second plurality of layers of material.

15. (previously presented) The current sensor of claim 9, whercin;  
said first plurality of layers of material has about 20% more Ni than said second plurality of layers of material.

16. (previously presented) The current sensor of claim 9, whercin;  
said first plurality of layers of material has about 30% more Ni than said second plurality of layers of material.

17-41. (Canceled)

42. (currently amended) The current sensor of Claim 9, whercin a root-mean-square current sensing accuracy of said mixed material magnetic core is equal to or greater than about 98.7% in response to a current in said conductor being at about ~~0.2X~~  
0.2 times the current rating of the device.

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43. (currently amended) The current sensor of Claim 9, wherein a root-mean-square current sensing accuracy of said mixed material magnetic core is equal to or greater than about 99.7% in response to a current in said conductor being at about 1X one times the current rating of the device.

44. (currently amended) The current sensor of Claim 9, wherein a root-mean-square current sensing accuracy of said magnetic core is greater than about 94% in response to a current in said conductor being at about 9X nine times the current rating of the device.

45. (currently amended) The current sensor of Claim 9, wherein a peak-current sensing accuracy of said magnetic core is equal to or greater than about 90% in response to a current in said conductor being at about 1000X one thousand times the current rating of the device.